

Table of comparative maximum and minimum temperatures for November.

State or Territory.	Station.	For 1886.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
Alabama	Mobile	76.4	30.5	82.0	1879, 1882	27.0	'72, '77, '81
Do	Montgomery	79.0	31.3	83.0	1879, 1882	21.0	1872
Arizona	Prescott	71.0	2.0	75.0	1878, 1885	1.0	1880
Do	Fort Apache	72.0	3.6	77.0	1882	9.0	1880
Arkansas	Fort Smith	75.0	22.1	80.0	1882	1.0	1880
Do	Little Rock	72.7	25.0	83.0	1882	10.0	1880
California	San Francisco	75.0	45.0	78.0	1871	41.0	1880
Do	San Diego	77.0	40.0	82.0	1873	38.0	1881
Colorado	Denver	63.0	6.0	76.0	1876, 1879	18.0	1877
Do	Pike's Peak	23.9	27.0	33.2	1885	38.0	1880
Connecticut	New Haven	70.2	24.0	71.5	1882	4.0	1875
Do	New London	66.3	26.5	72.0	1882	4.0	1875
Dakota	Fort Buford	57.5	10.0	62.0	1879	20.0	1881
Do	Yankton	70.4	0.0	76.0	1876	15.0	1875
Delaware	Del. Breakwater			73.0	1881	23.0	1880
Do	Cape Henlopen	74.0	35.6				
District of Columbia	Washington City	73.1	22.2	80.0	1879	12.5	1880
Florida	Jacksonville	81.9	35.5	84.0	1875, 1877	30.0	1873
Do	Key West	89.8	64.1	91.0	1882	52.0	1873
Georgia	Atlanta	75.2	27.9	80.5	1882	20.0	1883
Do	Savannah	78.0	35.0	82.0	1875	22.0	1872
Idaho	Boise City	58.3	9.4	70.0	1878	7.0	1880
Illinois	Chicago	74.2	24.6	80.5	1882	7.0	1882
Do	Chicago	68.8	16.4	72.0	1874, 1882	7.0	1882
Indiana	Indianapolis	71.6	16.5	75.0	1879	5.0	1880
Indian Territory	Fort Sill	76.9	19.0	84.0	1875	4.0	1880
Iowa	Dubuque	69.5	11.3	69.0	1874, 1879	9.0	1875
Do	Keokuk	69.4	15.2	74.0	1874	7.0	1872
Kansas	Dodge City	73.0	7.3	83.0	1875	0.0	1880
Do	Leavenworth	77.0	15.0	77.0	1874	0.0	1872
Kentucky	Louisville	75.1	21.7	78.0	1879	4.5	1872
Louisiana	New Orleans	82.2	34.4	84.7	1885	31.5	1881
Do	Shreveport	79.4	20.7	86.0	1882	18.0	1880
Maine	Eastport			64.0	1882	13.0	1875
Do	Portland	58.7	21.4	66.0	1882	6.0	1875
Maryland	Baltimore	73.2	26.0	78.0	1879	15.0	1880
Massachusetts	Boston	66.1	24.0	75.0	1876	2.0	1875
Michigan	Detroit	64.9	18.6	69.0	1879, 1882	0.0	1880
Do	Alpena	61.0	11.2	64.2	1885	4.0	1880
Minnesota	Duluth	67.0	4.3	65.0	1874	29.0	1875
Do	Saint Paul	73.6	5.3	72.0	1885	24.5	1875
Mississippi	Vicksburg	81.1	27.8	84.8	1885	23.0	1877, 1880
Missouri	Saint Louis	75.1	23.2	82.0	1879	5.0	1872
Montana	Fort Benton			71.6	1884	31.0	1880
Do	Helena	58.8	8.8	62.0	1884	17.0	1880
Nebraska	North Platte	66.7	5.0	79.0	1876	10.0	1881
Do	Omaha	73.1	9.1	74.0	1874	6.0	1875
Nevada	Winnemucca	58.7	0.6	70.8	1885	9.0	1880
New Hampshire	Mount Washington	45.3	1.8	51.0	1885	40.0	1875
New Jersey	Atlantic City	65.0	24.4	72.0	1881	10.0	1875
Do	Sandy Hook	68.9	29.0	73.0	1881	6.0	1880
New Mexico	Santa Fé	58.8	0.4	77.0	1878	11.0	1880
New York	Buffalo	62.0	22.4	68.3	1881	2.5	1875
Do	New York City	72.7	28.6	74.0	1882	7.0	1875
North Carolina	Charlotte	74.0	27.5	80.0	1879	18.0	1880
Do	Wilmington	77.4	29.7	83.0	1877, 1879	20.0	1872
Ohio	Cincinnati	72.8	18.1	75.8	1882	5.0	1880
Do	Cleveland	71.0	19.6	72.5	1882	0.0	1880
Oregon	Portland	57.8	25.6	68.0	1873	22.5	1880
Do	Roseburg	73.0	22.3	69.7	1884	17.5	1880
Pennsylvania	Pittsburg	68.8	22.0	79.0	1876	4.0	1880
Do	Philadelphia	72.7	26.9	77.0	1881	8.0	1875
Rhode Island	Block Island	63.5	32.5	70.0	1881	19.0	1880
South Carolina	Charleston	78.0	34.9	82.0	1879	28.0	1881
Tennessee	Knoxville	72.5	23.7	80.5	1881	11.5	1872
Do	Nashville	73.6	22.7	80.6	1882	13.0	1872
Texas	Fort Davis	81.0	17.5	81.6	1883	6.0	1880
Do	Galveston	85.1	34.5	82.0	1875, 1878	29.0	1880
Utah	Salt Lake City	60.0	14.4	70.0	1882	3.0	1880
Virginia	Lynchburg	73.3	24.1	80.2	1882	13.0	1880
Do	Norfolk	74.8	29.7	80.0	1879	20.0	1872
Washington Ter.	Spokane Falls	53.8	5.4	60.0	1885	3.0	1881
Do	Olympia	57.5	27.0	63.0	1884	21.0	1882
Wisconsin	La Crosse	67.8	6.7	70.0	1874	21.0	1875
Do	Milwaukee	67.3	11.3	70.0	1874, 1882	14.0	1875
Wyoming	Cheyenne			69.0	1876	20.0	1875

Middle slope.—1st to 30th.

Southern slope.—2d to 6th, 8th, 9th, 11th to 21st, 23d to 29th.

Southern plateau.—1st to 5th, 8th to 11th, 13th to 30th.

Middle plateau.—1st to 30th.

Northern plateau.—1st to 19th, 21st, 22d, 24th to 30th.

North Pacific coast region.—1st to 23d, 25th to 30th.

Middle Pacific coast region.—1st to 7th, 10th, 12th, 13th, 14th, 16th to 19th, 20th to 30th.

South Pacific coast region.—Los Angeles, California, 1st, 2d, 3d, 13th, 16th, 17th, 18th, 19th, 22d, 23d, 24th; Poway, California, 17th to 21st, 23d, 24th, 25th; Cahuenga, California, 17th, 19th, 24th.

ICE.

Ice formed in the southern parts of the country, as follows:

Alabama.—Mobile, 18th; Montgomery, 26th, 28th.

Arizona.—Yuma, 20th.

California.—Los Angeles, 16th, 17th, 19th.

Florida.—Pensacola, 19th.

Georgia.—Forsyth, 7th, 8th, 9th, 14th, 26th to 29th.

Mississippi.—Vicksburg, 18th.

North Carolina.—Reidsville, 1st, 7th, 8th, 9th; Raleigh, 7th; Charlotte, 19th, 27th; Smithville, 8th, 19th.

New Mexico.—Gallinas Spring, 2d.

South Carolina.—Charleston, 8th, 9th; Spartanburg, 9th, 19th, 20th, 26th to 29th.

Tennessee.—Chattanooga, 7th, 8th, 9th, 14th, 18th, 19th, 26th, 28th; Nashville, 1st, 7th, 8th, 14th, 15th, 16th; Milan, 7th; Ashwood, 1st, 7th, 8th, 13th to 16th, 18th, 19th, 26th, 27th.

Texas.—Abilene and Fort Davis, 13th and 17th; Galveston, 17th; Corsicana, 13th, 16th, 17th, 18th, 20th, 25th, 26th, 27th.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for November, 1886.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
Alpena, Michigan	46.3	30.6	15.7	11.2	32.0
Augusta, Georgia	59.6	49.8	9.8	6.9	51.9
Baltimore, Maryland	59.6	45.0	14.6	12.3	46.4
Block Island, Rhode Island	56.4	45.5	10.9	8.1	46.6
Boston, Massachusetts	52.2	42.1	10.1	22.6	47.8
Buffalo, New York	53.0	33.7	19.3	14.3	37.3
Canby Fort, Washington Territory	49.3	46.0	3.3	14.8	45.6
Cedar Keys, Florida	73.1	55.1	17.0	7.7	60.0
Charleston, South Carolina	66.9	56.7	10.2	37.3	57.1
Chincoteague, Virginia	69.4	46.2	23.2	3.1	50.0
Chicago, Illinois	48.4	32.5	15.9	8.1	38.2
Cleveland, Ohio	55.0	37.7	17.3	13.2	38.9
Detroit, Michigan	49.9	33.9	16.0	26.9	38.5
Duluth, Minnesota	45.1	35.7	9.4	10.7	27.8
Escanaba, Michigan	49.7	30.2	13.5	18.8	30.1
Galveston, Texas	70.4	51.2	19.2	14.4	62.0
Grand Haven, Michigan	49.6	32.2	17.4	18.2	35.4
Jacksonville, Florida	70.9	58.5	12.4	18.0	59.1
Key West, Florida	79.2	72.2	7.0	18.8	73.2
Mackinaw City, Michigan	52.1	34.0	18.1	9.8	34.6
Macon, Fort, North Carolina	65.7	52.6	13.1	14.7	55.2
Marquette, Michigan	49.4	35.9	13.5	11.0	30.4
Mobile, Alabama	68.5	56.5	12.0	16.6	56.1
New London, Connecticut	57.6	47.0	10.6	11.5	44.4
New York City	56.6	46.8	9.8	15.4	45.3
Norfolk, Virginia	60.3	49.3	11.0	15.9	51.2
Pensacola, Florida	76.0	55.1	20.9	17.3	58.4
Portland, Maine	49.1	41.9	7.2	16.7	38.7
Portland, Oregon	49.6	40.1	9.5	48.8	41.6
Sandusky, Ohio	50.0	34.1	15.9	10.0	38.2
San Francisco, California	56.0	52.1	3.9	38.3	55.1
Savannah, Georgia	68.3	52.6	15.7	10.2	58.0
Toledo, Ohio	50.0	33.9	16.1	12.2	36.6
Wilmington, North Carolina	59.6	51.9	4.7	8.3	55.3

* Record for 27 days.

† Record for 23 days.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for November, 1886, as determined from the reports of about five hundred and eighty stations, is exhibited on chart iii.

The precipitation of the month is above the normal in New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, the Ohio Valley, Tennessee, Arkansas, and the northern portion of the east Gulf States; it is also excessive in Minnesota, Dakota, Montana, and the upper part of the Missouri Valley; in all other districts it is deficient. The departures in excess of the normal are nowhere very large; the greatest occur in Tennessee and the Ohio Valley; one station, Memphis, gives an excess 4.46; the departures in the extreme northwest are small, averaging 0.68. The rainfall of the Pacific coast has been very small, and large deficiencies occur in this region; they are especially large in the southern part of Washington Territory and in northern Oregon. Over the extreme northwestern point of Washington Territory the precipitation is unusually large, 11.80 falling at Neah Bay, and 10.44 at

Tatoosh Island. The rainfall of California is notably small for November; at Sacramento it is only one-eleventh and at San Francisco about one-fourth of the normal. The deficiencies are also large in Texas and along the Atlantic coast from the Chesapeake Bay southward to Key West, Florida; at Palestine, Texas, the rainfall is 4.11, and at Galveston, Texas, 2.36 below the normal. Numerous reports of the evil effects of the long drought that has prevailed during the summer and autumn months continue to come from that state.

The following are some of the most marked departures from the normal precipitation at Signal Service stations:

Above normal.		Below normal.	
	Inches.		Inches.
Memphis, Tennessee.....	4.46	Portland, Oregon.....	6.17
Montgomery, Alabama.....	3.16	Olympia, Washington Territory.....	5.90
Knoxville, Tennessee.....	2.90	Hatteras, North Carolina.....	4.50
Albany, New York.....	2.72	Fort Canby, Washington Territory.....	4.23
Buffalo, New York.....	2.62	Palestine, Texas.....	4.11
Pittsburg, Pennsylvania.....	2.46	Kitty Hawk, North Carolina.....	3.81

In the following table are shown, for the several geographical districts, the normal precipitation for November; the average for November, 1886, and the excess or deficiency as compared with the normal:

Average precipitation for November.			
Districts.	Average for Nov., Signal-Service ob- servations.		Comparison of Nov., 1886, with the aver- age for several years.
	For sev- eral years.	For 1886.	
	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
New England.....	3.94	4.56	+ 0.62
Middle Atlantic States.....	3.43	3.91	+ 0.48
South Atlantic States.....	3.58	1.43	- 2.15
Florida Peninsula.....	2.16	0.62	- 1.54
Eastern Gulf States.....	4.86	4.75	- 0.11
Western Gulf States.....	4.50	3.27	- 1.23
Rio Grande Valley.....	1.54	0.96	- 0.58
Tennessee.....	4.36	6.82	+ 2.46
Ohio Valley.....	3.39	4.61	+ 1.22
Lower lake region.....	3.61	4.65	+ 1.04
Upper lake region.....	2.62	2.57	- 0.05
Extreme northwest.....	0.78	1.47	+ 0.69
Upper Mississippi Valley.....	2.44	2.39	- 0.05
Missouri Valley.....	1.21	1.56	+ 0.35
Northern slope.....	0.64	1.09	+ 0.45
Middle slope.....	0.58	0.52	- 0.06
Southern slope.....	1.20	0.25	- 0.95
Southern plateau.....	0.61	0.48	- 0.13
Middle plateau.....	1.28	1.30	+ 0.02
Northern plateau.....	1.59	1.07	- 0.52
North Pacific coast region.....	6.86	2.46	- 4.40
Middle Pacific coast region.....	2.77	0.71	- 2.06
South Pacific coast region.....	0.79	0.79	0.00

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of November for a series of years, the precipitation for November, 1886, and the departures from the average:

Station.	County.	Average precipitation for Nov.	Number of years.	Precipitation for Nov., 1886.	Departure.
		Inches.		Inches.	Inches.
<i>Arkansas.</i>					
Lead Hill.....	Boone.....	4.10	5	3.49	- 0.61
<i>California.</i>					
Sacramento.....	Sacramento.....	2.11	21	0.11	- 2.00
<i>Connecticut.</i>					
Canton *.....	Hartford.....	4.70	25	5.37	+ 0.67
Hartford *.....	Hartford.....	3.61	15	5.60	+ 1.99
Middletown *.....	Middlesex.....	3.92	28	4.33	+ 0.41
New Haven *.....	New Haven.....	3.95	14	3.83	- 0.12
Wallingford *.....	New Haven.....	3.80	28	4.68	+ 0.79
<i>Dakota.</i>					
Webster.....	Day.....	1.25	4	4.33	+ 3.08
<i>Florida.</i>					
Archer.....	Alachua.....	1.76	4	1.08	- 0.68
<i>Illinois.</i>					
Anna.....	Union.....	4.31	11	6.65	+ 2.34
Mattoon.....	Coles.....	3.70	6	2.65	- 1.05
Peoria.....	Peoria.....	2.37	30	1.34	- 1.03
Riley.....	McHenry.....	2.02	26	0.98	- 1.04
Sandwich.....	De Kalb.....	2.79	35	1.47	- 1.32
Sycamore.....	De Kalb.....	3.00	6	0.66	- 2.04

Deviations from average precipitation—Continued.

Station.	County.	Average precipitation for June.	Number of years.	Precipitation for June, 1886.	Departure.
		Inches.		Inches.	Inches.
<i>Indiana.</i>					
Lafayette.....	Tippecanoe.....	2.70	7	1.87	- 0.83
Logansport.....	Cass.....	2.91	31	3.71	+ 0.80
Vevay.....	Switzerland.....	3.08	21	4.54	+ 1.46
<i>Iowa.</i>					
Cresco.....	Howard.....	1.47	14	1.86	+ 0.39
Monticello.....	Jones.....	2.46	33	1.35	- 1.11
<i>Kansas.</i>					
Independence.....	Montgomery.....	2.04	14	1.70	- 0.34
Wellington.....	Sumner.....	1.06	8	0.10	- 0.96
Yates Centre.....	Woodson.....	1.77	6	1.34	- 0.43
<i>Maine.</i>					
Cornish.....	York.....	3.73	29	4.78	+ 1.05
Gardiner *.....	Kennebec.....	4.49	48	5.97	+ 1.48
Orono *.....	Penobscot.....	4.42	18	8.57	+ 4.15
<i>Maryland.</i>					
Fallston.....	Harford.....	3.60	16	4.19	+ 0.59
<i>Massachusetts.</i>					
Amherst *.....	Hampshire.....	3.80	52	4.72	+ 0.92
Cambridge *.....	Middlesex.....	3.92	46	3.91	- 0.01
Chestnut Hill *.....	Middlesex.....	4.45	11	4.03	- 0.42
Framingham *.....	Middlesex.....	3.98	12	4.47	+ 0.49
Lake Cochituate *.....	Middlesex.....	4.51	35	4.76	+ 0.25
Lowell *.....	Middlesex.....	3.88	62	5.10	+ 1.22
Lynn *.....	Essex.....	4.10	12	3.96	- 0.14
Mystic Lake *.....	Middlesex.....	3.96	11	4.07	+ 0.11
Somerset.....	Bristol.....	4.45	16	4.49	+ 0.04
Springfield *.....	Hampden.....	3.85	39	4.77	+ 0.92
Waltham *.....	Middlesex.....	4.28	62	4.02	- 0.26
<i>Nevada.</i>					
Carson City.....	Ormsby.....	1.10	8	0.44	- 0.66
<i>New Brunswick.</i>					
Saint John *.....	Saint John.....	5.65	26	6.16	+ 0.51
<i>New Hampshire.</i>					
Antrim.....	Hillsborough.....	4.71	15	6.15	+ 1.44
Concord *.....	Merrimac.....	3.49	31	3.81	+ 0.32
Hanover *.....	Grafton.....	2.51	20	4.94	+ 2.43
<i>New York.</i>					
Palermo.....	Oswego.....	3.94	33	4.31	+ 0.37
<i>Ohio.</i>					
Wauseon.....	Fulton.....	3.08	14	2.66	- 0.42
Westerville.....	Franklin.....	2.83	12	3.22	+ 0.39
<i>Pennsylvania.</i>					
Dyberry.....	Wayne.....	3.12	16	7.10	+ 3.98
<i>South Carolina.</i>					
Kirkwood.....	Kershaw.....	2.47	20	0.92	- 1.55
Stateburg.....	Sumter.....	2.05	6	0.87	- 1.18
<i>Texas.</i>					
New Ulm.....	Austin.....	5.41	15	1.50	- 3.91
<i>Vermont.</i>					
Lunenburg *.....	Essex.....	3.23	38	3.45	+ 0.22
Newport *.....	Orleans.....	3.66	11	7.80	+ 4.14
Stratford.....	Orange.....	3.58	12	4.97	+ 1.39
<i>Virginia.</i>					
Bird's Nest.....	Northampton.....	2.22	18	2.75	+ 0.53
Dale Enterprise.....	Rockingham.....	1.75	6	6.46	+ 4.71
Variety Mills.....	Nelson.....	2.18	8	3.81	+ 1.63
<i>West Virginia.</i>					
Helvetia.....	Randolph.....	3.90	10	4.53	+ 0.63

* From the "Bulletin of the New England Meteorological Society."

The following notes, in connection with this subject, are furnished by voluntary observers:

Illinois.—Riley, McHenry county: the total precipitation of the autumn of 1886, 5.78, is 3.82 less than the average of the past twenty-five years; two autumns only during that time have had less precipitation, viz., 1867 and 1869.

Indiana.—Logansport, Cass county: snow and total precipitation comparisons for November during the past thirty-one years: greatest snowfall, 18.5 inches, in 1874; least, 0.1 inch, in 1865; normal depth of snowfall, 4.9 inches; no snow fell during the month in 1860, 1861, and 1883. Greatest precipitation, 6.29 in 1864; least, 0.41, in 1865.

Vevay, Switzerland county: during the past twenty-one years the largest November precipitation, 5.73, fell in 1883; the least, 0.73, in 1872. The largest total snowfall for November, 15.0 inches, occurred in 1880; the least, 0.1 inch, in 1868. No snow fell in November, 1865, 1866, 1867, 1875, 1877, 1878, 1879, 1883, and 1885; the snowfall for November, 1886, 3.2 inches, is 1.2 above the average.

Spiceland, Henry county: during the past thirty-three years the greatest November precipitation, 6.00, occurred in 1864; the least, 0.60, in 1872.

Iowa.—Monticello, Jones county: the snowfall for November, 1886, 2.2 inches, is 1.3 inches below the average of the past thirty-three years; the largest snowfall for November, 16.1 inches, occurred in 1869; the largest precipitation, 5.29, in 1879; the least, 0.12, in 1869.

Kansas.—Yates Centre, Woodson county: the precipitation of the autumn of 1886, 6.35, is 3.28 below the average of the past six years.

Wellington, Sumner county: the precipitation of the present month, 0.10, is less than that of any November during the past eight years.

Maryland.—Fallston, Harford county: during the past sixteen Novembers the greatest precipitation, 10.27, occurred in 1877; the least, 4.45, in 1882.

Massachusetts.—Worcester, Worcester county: the precipitation for the month aggregated 5.19 inches of rain and melted snow, and .04 inch of snow, against 5.96 inches of rain and melted snow during the corresponding period in

1885. The aggregate rainfall, including melted snow, for the eleven months of 1886 is 45.87 inches against 40.23 inches during the same period last year. The rainfall thus far this year is nearly 6 inches greater than the average yearly rainfall in New England.

New York.—Palermo, Oswego county: during the past thirty-three years the largest snowfall for November, 39.2 inches, occurred in 1880; the least, 2.0 inches, in 1877; the snowfall of the present month, 24.2 inches, is 4.8 below the average.

Ohio.—Westerville, Franklin county: the largest November precipitation during the past twelve years, 4.55, occurred in 1881; the least, 1.08, in 1884.

Wauseon, Fulton county: the total snowfall of the month, 3.6 inches, is 2.6 inches less than the average of the past fourteen years; the largest November snowfall, 15.7 inches, occurred in 1874; the least, 0.8 inch, in 1883. The greatest amount of precipitation for November, 5.83, occurred in 1881; the least, 1.46, in 1884.

Pennsylvania.—Dyberry, Wayne county: the precipitation of the month, 7.10, is greater than that of any other month during the past sixteen years, except August, 1885, 8.77; July, 1882, 7.24; and July, 1871, 7.68.

Texas.—New Ulin, Austin county: the total precipitation of the autumn of 1886, 3.41, is 1.72 inches below the average of the past fifteen years.

Virginia.—Dale Enterprise, Rockingham county: during the past six years the greatest precipitation in November, 6.46, occurred in 1886; the least, 0.52, in 1882.

Variety Mills, Nelson county: during the past eight years the greatest November precipitation, 4.63, occurred in 1880; the least, 0.59, in 1882.

West Virginia.—Helvetia, Randolph county: during the past ten years the largest November precipitation, 7.98, occurred in 1878; the least, 2.05, in 1883.

Table of excessive and greatest monthly precipitation for November, 1886.

Station.	Specially heavy.		Largest monthly.	Amount.	Station.	Specially heavy.		Largest monthly.	Amount.
	Date.	Amt.				Date.	Amt.		
Alabama.					Ohio—Con.				
Mount Vernon	23, 24	2.45	7.03		College Hill	16, 17	2.00		
Montgomery	24	2.02	6.72		Jacksonborough	16, 17	2.00		
Connecticut.					Pennsylvania.				
Hartford			6.32		York	12, 13	3.03	9.50	
Voluntown	6, 7	2.10			Do	17	2.00		
Dakota.					Do	26	3.00		
Webster	29, 30	2.48			Dyberry			7.10	
Illinois.					Bloomington	25, 26	2.20	7.00	
Anna	16, 17	2.67	6.65		Drifton			6.52	
Indiana.					Wellsborough	17, 18	3.65	6.50	
Butler	17	2.35			Do	23	2.60		
Mauzy	17	2.30			Erie			6.21	
Columbus	17	2.25			Zionsville			6.06	
Princeton	17	2.30			Gramplan Hills			6.03	
Counersville	17	2.48			Tennessee.				
Greenfield	17	2.20			Memphis	21	3.24	8.89	
Farmland	17	2.30			Milan	16, 17	2.20	8.65	
Brookville	17	2.25			Do	20, 21	2.05		
Indianapolis	16, 17	2.44			Covington	21	3.96	8.58	
Kentucky.					Riddleton	17	2.87	8.15	
Frankfort	23	2.08	6.18		Do	22	2.65		
Louisiana.					Bolivar	16	2.30	8.02	
New Orleans	23, 24	2.35			Do	21	3.67		
Maine.					McKenzie			8.00	
Orono	6, 7	4.58	8.67		Manchester	17	3.60	7.97	
Do	17, 18	2.25			Trenton			7.73	
Gardiner			6.06		Woodstock	21	3.15	7.35	
Massachusetts.					Knoxville	23, 24	2.25	7.21	
Williamstown	24, 25	2.27			Howell	17	2.20	6.50	
Michigan.					Beech Grove	17	2.65	6.43	
Alpena	17, 18	2.32			Austin	16, 17	2.00	6.30	
Mississippi.					Do	21, 22	2.50		
Vicksburg	16, 17	2.30			Rogersville			6.36	
Missouri.					Farmington	17	3.37	6.33	
Centerville	11	2.40			Andersonville	22, 23	2.21	6.28	
New Hampshire.					Sailor's Rest	21, 22, 23	4.31	6.26	
Mt. Washington	18	2.02	6.48		Savannah	21	2.18	6.17	
Bristol			6.38		Greenville	21	2.10	6.10	
Antrim	17, 18	2.00	6.15		Jonesborough	22, 23, 24	4.41		
Woodstock	17, 18	2.52	6.13		Fostoria	21	2.70		
Ashland			6.11		Cookeville	17	2.00		
New Jersey.					Florence Station	17	2.22		
Clayton	18	2.00			Hurricane Switch	17	2.41		
New York.					Dyersburg	21	2.00		
Auburn	14, 15	2.12	6.89		Vermont.				
Humphrey			6.23		Newport			7.80	
Buffalo			6.05		Poultney	26	2.09	7.75	
Ithaca			6.03		Post Mills	17	2.80	6.45	
North Carolina.					Virginia.				
Fiat Rock	18	3.12	8.51		Dale Enterprise			6.46	
Do	24, 25	2.66			Washington Ter.				
Stateville	25	2.79			Nash Bay	28, 29	3.65	11.80	
Lenoir	25	3.80			Tatoosh Island	26 to 29	5.67	10.44	
Lincolnton	24, 25	2.04			West Virginia.				
Ohio.					Helvetia	6, 7	3.00		
West Milton			6.00						
Ruggles	16, 17	2.40							

SNOW.

North Platte, Nebraska: a snow storm set in at 6.45 p. m. of the 15th and continued until 8.45 p. m. of the 16th, the storm was accompanied by high northerly winds, attaining

during the day a velocity of forty miles per hour, and drifting the snow in places to a depth of six or eight feet. This was an unusually severe storm, and, on account of the high wind and low temperature, caused much suffering; a large number of cattle and sheep perished. Business was entirely suspended and trains were delayed for two days.

Genoa, Nance county, Nebraska: on the night of the 15-16th a violent storm of wind and snow set in and continued until the morning of the 17th. The wind blew violently from the southeast, drifting the snow and blockading the roads. This snow storm was more severe than any other that has occurred in November for several years.

Dubuque, Iowa: light snow fell on the 16th and 17th and heavy snow on the 18th until 3.30 p. m., when the sky began clearing. This storm was very severe north and west of Dubuque and all trains arrived several hours late.

Saint Paul, Minnesota: during the 17th the barometer fell rapidly and high northerly winds prevailed, with light snow, until 11.20 a. m. From 1.30 a. m. until midnight the snow drifted badly and street-car travel was entirely suspended in Saint Paul and Minneapolis. Much delay to railway trains was reported, the greatest trouble was to the southward, where trains were delayed from two to eight hours on account of the heavy snow. During the night of the 17-18th the wind continued to blow hard from the north and northwest; maximum velocity, twenty-nine miles per hour, shortly after 1 a. m.

Omaha, Nebraska: during the 16th, 17th, and 18th light and heavy snow fell to a depth of fourteen inches; on the 17th it was accompanied by high wind which formed large drifts and filled railroad cuttings, delaying all trains.

Huron, Dakota: light snow fell on the 21st from 9.50 p. m. until after midnight, when heavy rain, accompanied by brisk northeasterly winds, set in. At 7.30 p. m. of the 18th snow again began falling, accompanied by a heavy gale from the southwest, veering to west and northwest, and blowing steadily at an average velocity of thirty-seven miles per hour all night; maximum velocity forty-two miles per hour. This storm was very severe over the surrounding country, and several deaths from exposure were reported.

Bismarek, Dakota: light snow fell during the night of the 21st-22d; on the 22d it fell heavily and was accompanied by high northeasterly winds which attained a maximum velocity of thirty-eight miles per hour between 1 and 2 p. m.; at 9 p. m. the wind backed to north and blew at the rate of twenty-five miles per hour. The heavy snow continued until 9 a. m. of the 23d, and the high wind still prevailed, blowing from the northwest; maximum velocity, thirty-two miles per hour, at 10.40 a. m. The high wind which prevailed during this storm drifted the snow to a great depth, in some railroad cuts the track was covered to a depth of twenty-five or thirty feet. This "blizzard" extended all over Dakota and into Montana; in the neighborhood of Glendive, in Montana, many cattle perished.

The dates on which snow fell in the various districts are as follows:

New England.—7th to 14th, 17th to 21st, 23d, 25th to 30th.

Middle Atlantic states.—4th, 6th to 16th; 19th, 20th, 25th to 30th.

South Atlantic states.—7th, 9th, 25th.

West Gulf states.—Lead Hill, Arkansas, 12th, 17th; Fort Gibson, Indian Territory, Little Rock and Fort Smith, Arkansas, Shreveport, Louisiana, Palestine and Corsicana, Texas, 17th; Grand Coteau, Louisiana, 18th to 21st.

Tennessee.—9th, 17th, 18th, 19th.

Ohio Valley.—5th, 6th, 7th, 9th, 11th, 12th, 13th, 17th, 18th, 25th, 26th, 27th, 29th, 30th.

Lower lake region.—4th, 6th to 16th, 18th to 21st, 24th to 30th.

Upper lake region.—1st, 2d, 4th to 11th, 13th, 16th to 30th.

Extreme northwest.—4th, 5th, 17th, 20th to 23d, 25th to 30th.

Upper Mississippi valley.—5th, 6th, 12th, 15th to 18th, 21st to 30th.

Missouri Valley.—5th, 6th, 10th, 11th, 12th, 15th to 19th, 21st to 30th.

Northern slope.—1st, 2d, 4th, 5th, 8th, 11th, 14th to 17th, 19th to 26th, 28th, 29th, 30th.

Middle slope.—1st, 3d, 5th, 7th to 12th, 15th, 16th, 17th, 19th, 21st to 24th, 29th, 30th.

Southern slope.—Fort Stanton, New Mexico, 17th, 22d.

Southern plateau.—8th, 9th, 13th, 16th to 22d, 24th.

Middle plateau.—1st, 2d, 6th, 8th to 24th.

Northern plateau.—4th, 6th, 8th, 9th, 12th, 14th to 24th, 30th.

North Pacific coast region.—11th, 14th, 18th to 23d, 27th.

Middle Pacific coast region.—3d, 5th, 6th, 21st.

MONTHLY SNOWFALLS.

[Expressed in inches and tenths.]

The following stations report monthly snowfalls of one inch or more:

Arizona.—Prescott, 8.3; Fort Apache, 4.2; Willcox, 2.

California.—Fort Bidwell, 8.5; Boca, 7; Emigrant Gap, 4; Hot Springs, 3.

Colorado.—Montrose, 13; Denver, 9.8; Pike's Peak, 6.6; Las Animas, 4.9.

Connecticut.—North Colebrook, 7.5.

Dakota.—Yankton, 29.8; Deadwood, 28.8; Vermillion, 22; Fort Yates, 15.8; Richardton, 15; Webster, 13; Bismarck, 11; Fort Totten, 7.3; Huron, 3.2.

Idaho.—Boisé City, 2.1.

Illinois.—Flora, 17.5; Palestine, 17.2; Martinsville and Sumner, 17; Windsor, 12.5; Fairfield, 12; Mascoutah, 10.7; Eberle, McLeansborough, Vandalia, and Richview, 10; Greenville, 8; Carlyle, 7.5; Charleston, 7.1; Philo and Jerseyville, 7; Erwin, 6.8; Payson, 6.3; Mattoon, White Hall, and Mount Carmel, 6; Oneida and Bluffdale, 5.5; Springfield, 5.2; Camden, 5; Atwood, 4; Makanda, 3.5; Lake Forest and Melvin, 3; Chicago, 2.6; Anna, 2.3; Decatur, 2.2; Griggsville, 2.1; Pekin, Marengo, Rockford, Riley, Sycamore, Shawneetown, and Peoria, 2.

Indiana.—Princeton, 18.5; Worthington, 14; Columbus and Sunman, 10.6; Blue Lick, 10.2; Butlerville, 10; Farmland, 7.5; Spiceland, Franklin, and Mauzy, 7; Brookville, 6; Indianapolis, 5.8; Jeffersonville, 5.3; Degonia, Richmond, and Logansport, 5; Connersville, 4.8; Marengo and Laconia, 4; Terre Haute and La Grange, 3.5; Vevay, 3.2; Marion, 2.

Iowa.—Des Moines, 16; Bancroft, 13; Cresco, 8.5; Oskaloosa, 6.5; Keokuk, 6.4; West Point, 6.2; Dubuque, 4.7; Cedar Rapids *a*, 4.6; Independence, 4; Muscatine, 3.3; Monticello, 2.2; Cedar Rapids *b*, 2.

Kansas.—Allison, 10.5; Dodge City, 4.2; Globe, 3; Salina, 2.5; El Dorado, 2.

Kentucky.—Louisville, 3.1; Richmond, 2.4.

Maine.—Cornish, 14; Orono, 6; Gardiner, 3.8.

Massachusetts.—Dudley, 5; Blue Hill Observatory, Princeton, Westborough, and Williamstown, 2.

Michigan.—Marquette, 35.7; Traverse City, 23.5; Mackinaw City, 18.9; Alpena, 15.4; Escanaba, 13; Thornville, 10.5; Harrisville, 8.1; Mottville, 7; Kalamazoo, 5.6; Lansing, 4.8; Grand Haven, 4.1; Hudson, 3.7; Port Huron, 2.

Minnesota.—Duluth, 24; Minneapolis, 23.5; Red Wing, 21.5; Moorhead, 20.8; Mankato, 20.6; Saint Paul, 19.6; Rochester, 18; Spring Valley, 17.8; Albert Lea, 15.5; Eau Claire, 15; Northfield, 13; Excelsior, 11.5; Winona, 11; Park Rapids, 9.5; Morris, 8; Bird Island, 7.5; Saint Vincent, 7; Alexandria, 4.5.

Missouri.—Saint Louis, 4; Centreville, 2.2.

Montana.—Fort Maginnis, 13.6; Poplar River, 9.2; Fort Assinaboine, 8.4; Helena, 4.9; Fort Custer, 3.2.

Nebraska.—Hay Springs, 20; De Soto, 17.4; Omaha, 15.7; Lincoln, 15; Fremont, 14.5; North Platte, 14.3; Weeping Water, 14; Genoa, 13.5; Syracuse, 13; Minden, 12.8; Vick, 12; Ashland, 10.5; Brownville, 9.4; Marquette, 8.2; York, 8; Valentine, 6.2; Crete, 5.5; De Witt, 5; Stockham, 4.

Nevada.—Battle Mountain and Toano, 13.5; Palisade, 12.5;

Halleck, 11.5; Carlin, 8.5; Beowawe, 8; Winnemucca, 6.8; Elko and Humboldt, 6; Wells, 5; Otego, 4.5; Carson City, 2.8; Galconda, 2.1.

New Hampshire.—Autrim, 7; Nashua, 2.

New Mexico.—Santa Fé, 2.3; Fort Stanton, 2.2.

New York.—Oswego, 34.3; Le Roy, 32.9; Cooperstown and Ithaca, 32; Humphrey, 29; Factoryville, 28.8; Buffalo, 27.3; Palermo, 24.2; Auburn, 24; Albany, 22.3; Rochester, 22.2; Penn Yan, 19; Menand Station (near Albany), 13.2.

Ohio.—Garrettsville, 22.3; Cleveland, 15.3; Hiram, 19.5; Ruggles, 11; Jacksonborough, 8; Columbus, 6.9; College Hill and North Lewisburg, 6.5; Yellow Springs, 6; West Milton, 5.5; Westerville, 5.6; Tiffin *a*, 4.5; Wauseon, 3.6; Tiffin *b*, 3.5; Napoleon, 3.

Oregon.—Lakeview, 7.2; Fort Klamath, 4.5.

Pennsylvania.—Wellsborough, 37.2; Dyberry, 34; Grampian Hills and Phillipsburg, 24; Erie, 18.5; Drifton, 11; Wilkesbarre, 9; Catawissa, 8.4; Blooming Grove, 3.5.

Utah.—Salt Lake City, 27.8; Frisco, 19.3; Corinne, 13; Ogden, 11.8; Blue Creek, 10; Promontory, 6.8; Terrace, 2.5.

Vermont.—Poultney, 49; Newport, 34.4; Charlotte, 32; Burlington, 30; Strafford, 27; Lunenburg, 24.5; Post Mills, 20.5; Brattleborough, 15.6.

Washington Territory.—Fort Spokane, 8.1.

West Virginia.—Helvetia, 15; Parkersburg, 2.9.

Wisconsin.—Wausau and Embarras, 18; Green Bay, 12.1; La Crosse, 7.4; Manitowoc, 6.8; Milwaukee, 6.2; Fond du Lac, 6; Delavan, 3.1; Beloit, 3; Prairie du Chien, 2.5; Madison, 2.

Wyoming.—Fort Bridger, 21.2; Fort Laramie, 15.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[Expressed in inches and tenths.]

Arizona.—Fort Grant, 0.2.

Colorado.—Pike's Peak, 1.

Dakota.—Yankton, 13; Fort Totten, 7; Deadwood, 6; Bismarck, 4; Huron, 3; Fort Buford, 2.

Illinois.—Springfield, 4; Chicago, 0.5.

Indiana.—Indianapolis, 0.7.

Iowa.—Keokuk, 6.2; Dubuque, 4.

Kentucky.—Louisville, 2.

Michigan.—Marquette, 8; Mackinaw City, 6; Alpena, 4; Grand Haven and Escanaba, 3; Port Huron, 0.7.

Minnesota.—Duluth, 16; Moorhead, 12; Saint Paul, 10; Saint Vincent, 6.

Missouri.—Saint Louis, 2.5.

Montana.—Poplar River, 5; Fort Maginnis, 1.5; Fort Custer, trace.

Nebraska.—Stromsburg, 11; De Soto, 6; Fremont, 4; Omaha and Hay Springs, 2; Valentine, trace.

New York.—Albany, 6; Oswego, 3; Buffalo and Rochester, 0.5.

Ohio.—Sandusky, Toledo, and Cleveland, trace.

Pennsylvania.—Pittsburg, 1; Erie, 0.5.

Utah.—Salt Lake City, 1.3.

Wisconsin.—Green Bay, 7; La Crosse, 6; Milwaukee, 2.

Wyoming.—Fort Bridger, 0.6.

HAIL.

New Haven, Connecticut: during the afternoon of the 30th a thunder-storm, accompanied by hail and brisk wind, occurred; the hail-stones varied in size from that of a pea to a marble.

Lynchburg, Virginia: a light thunder-storm, moving from west to east, passed over the town between 1.15 and 2.30 p. m. of the 30th; the storm was accompanied by heavy hail and light rain.

Hail also fell on the following dates:

Arizona.—Fort Verde, 1st.

Dakota.—Fort Sisseton, 22d; Fort Randall, 29th.

Illinois.—Cairo, 23d.

Indiana.—Vevay, 12th.

Kentucky.—Richmond, 9th.

Maine.—Kent's Hill, 12th; Cornish, 25th.
Massachusetts.—Amherst, 7th; Westborough, 13th.
Nebraska.—Valentine and Fort Robinson, 1st; Hay Spring, 2d, 5th.
New Jersey.—Beverly, 18th, 25th.
New York.—Setauket, 13th, 30th.
North Carolina.—Lenoir, 9th; Reidsville, 30th.
Ohio.—College Hill and Jacksonborough, 9th; Elyria, 6th.
Oregon.—Astoria, 8th, 20th; Albany, 17th.
Pennsylvania.—Wellsborough, 4th, 29th; Dyberry, 17th, 25th; Wilkesbarre, 18th; Blooming Grove, 25th.
Tennessee.—Nashville, 6th.
Utah.—Salt Lake City, 9th.
Virginia.—Chincoteague, 6th.
Washington Territory.—Walla Walla, 8th, 19th; Pysht, 17th; Neah Bay, 17th, 20th; Tatoosh Island and Bainbridge Island, 20th.
Wyoming.—Fort Laramie, 1st.
Wisconsin.—Embarras, 17th, 28th.

SLEET.

Sleet occurred in the various states and territories, as follows:
Connecticut.—Bethel, 10th.
Dakota.—Fort Meade, 4th; Fort Sully, 29th.
Idaho.—Boisé City, 9th, 20th.
Indiana.—Vevay, 9th.
Iowa.—Independence, 18th; Des Moines, 29th.
Kansas.—El Dorado, Emporia, and Globe, 11th.
Maine.—Cornish, 17th; Eastport, 17th, 18th.
Maryland.—Emmitsburg, 6th, 9th.
Massachusetts.—Deerfield, 7th; Worcester, 17th, 18th.
Michigan.—Kalamazoo, 10th.
Nebraska.—Tecumseh, 16th.
New Jersey.—Dover, 25th.
New York.—Oswego, 4th, 6th, 15th, 18th; Albany, 17th, 25th, 30th; West Point, 12th.
North Carolina.—Flat Rock, 9th.
Ohio.—Wauseon, 9th, 29th; Yellow Springs, 9th.
Oregon.—Linkville and Roseburg, 20th; East Portland, 22d.
Pennsylvania.—Pittsburg, 15th; Zionsville, 18th, 25th; Catawissa, 25th.
South Carolina.—Spartanburg, 9th.
Washington Territory.—Walla Walla, 24th.

WINDS.

The most frequent directions of the wind during November, 1886, are shown on chart ii by the arrows flying with the wind; they are also given in the table of miscellaneous meteorological data. In the Lake region the prevailing direction of the wind was from the west; in the middle Atlantic states and Missouri Valley, from the northwest; in the south Atlantic states, from the west or northwest. In other portions of the country the winds were variable.

HIGH WINDS.

[In miles per hour.]

Wind-velocities of fifty or more miles per hour were recorded during the month, as follows:

Mount Washington, New Hampshire, 54, se., 26th; 70, nw., 7th; 80, nw., 8th; 75, nw., 9th; 70, e., 13th; 99, nw., 14th; 98, nw., 15th; 83, nw., 16th; 94, sw., 17th; 84, sw., 18th; 66, nw., 19th; 70, w., nw., 20th; 54, w., 22d; 94, sw., 23d; 88, nw., 24th; 81, w., 26th.

Pike's Peak, Colorado, 62, nw., 4th; 60, nw., 5th; 56, w., 6th; 56, nw., 8th; 64, w., 9th; 52, ne., 17th; 60, ne., 18th; 79, w., 19th; 86, w., 20th; 68, w., 21st; 76, w., 23d.

Bismarck, Dakota, 53, nw., 4th.
 Fort Totten, Dakota, 64, nw., 4th.
 Cape Henry, Virginia, 60, w., 6th.
 Sandy Hook, New Jersey, 52, nw., 7th; 54, e., nw., 13th; 60, ne., 25th; 50, w., 26th.
 Fort Elliott, Texas, 50, nw., 16th.
 Marquette, Michigan, 53, e., 17th.

Mackinaw City, Michigan, 53, e., 17th.
 Block Island, Rhode Island, 52, sw., 18th.
 Buffalo, New York, 58, sw., 18th.
 Grand Haven, Michigan, 52, sw., 18th.
 Fort Maginnis, Montana, 52, nw., 27th.

LOCAL STORMS AND TORNADOES.

Chincoteague, Virginia: on the afternoon of the 6th a severe thunder-storm passed over this station, coming from the west. Rain began at 6.30 p. m.; total precipitation during the storm 1.02 inches. Hail began at 9.30 p. m. and continued until 9.50 p. m. At 9.27 p. m. the wind suddenly shifted to the west and blew at the rate of forty-five miles per hour.

Cape Henry, Virginia: a heavy thunder-storm from the northwest, accompanied by intense lightning and heavy rain, passed over this place between 9 and 11 p. m. of the 6th. During the storm a gale prevailed, the wind attaining at 9.45 p. m. a velocity of sixty miles per hour.

Bangor, Maine: a very heavy thunder-storm occurred here on the night of the 6-7th, the rainfall was large and the wind high, the electrical part of the storm was unusually intense for the season of the year. One dwelling was struck by lightning and slightly damaged, as well as several barns one of which was burned. The high wind also did considerable damage, blowing down fences, trees, and in the agricultural fair grounds, several buildings.

Keeler, California: a destructive wind occurred at 9 p. m. of the 14th at Panamint, Inyo county, wrecking a nearly completed quartz mill owned by the Surprise Mining and Milling Company. During the 14th the wind had been blowing a moderate gale from the southwest, which had not abated at the time of the disaster. At 9 p. m. a "secondary" wind from east set in, producing a violent whirlwind lasting about ten minutes, which completely demolished the south end of the mill. The studding, rafters, floor timbers, etc., were reduced to splinters, and the roof of corrugated iron was broken into fragments. The whole south side of the building was raised into the air, and the ground to the southwest for a distance of over one fourth of a mile was strewn with fragments.

Chambersburg, Franklin county, Pennsylvania: on the morning of the 17th a heavy rain storm set in and continued throughout the day; after sunset the wind began blowing a gale and continued to increase in force until 7 a. m. of the 18th, when it moved with the velocity of a high gale, blowing down chimneys, shutters, and houses. The greatest damage was done in the surrounding country, where numerous dwellings, school-houses, and barns were demolished and trees and fences blown down. In some parts of the county this storm exhibited, in the black whirling clouds which accompanied it and the direction in which the debris was scattered, the characteristics of a tornado.

Mobile, Alabama: at 10.50 a. m. of the 17th a thunder-storm, with light rain and high wind from the southeast, set in. At 1.45 p. m. the wind changed almost instantly from southeast to west, and blew for five minutes at the rate of fifty miles per hour, accompanied by unusually heavy thunder, lightning, and rain. Many branches of trees were broken off, and numerous out-houses, sheds, and fences were blown down, but no serious damage occurred. From 3 to 11 p. m. the barometer rose rapidly.

Wilkesbarre, Luzerne county, Pennsylvania: between 8 and 9 a. m. of the 18th a very high wind, which exhibited some of the characteristics of a tornado, passed over this county. Many substantial buildings were moved from their foundations and numerous light structures were completely destroyed. At Parsons, a small mining town three miles north of Wilkesbarre, two churches were damaged and several coal breakers partially destroyed, entailing a loss of \$10,000. The high school building in the town of Miner's Mill was badly wrecked, and in Kingston a church in course of construction was totally destroyed. Throughout the surrounding country farmers suffered severe loss, their barns and fences being blown down and orchards destroyed.